

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
GRACE HATCHERY
1992**

Prepared by:

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INTRODUCTION

Grace Fish Hatchery is owned and operated by the Idaho Department of Fish and Game (IDFG) and is funded by license money. The hatchery is located on the headwaters of Whiskey Creek, seven miles south of Grace, Idaho and two miles east of Highway 34 in Caribou County. Middle and West Whiskey Creek Springs are the water sources for the hatchery and are collected in pipes that deliver the water to the raceways.

Water flow is 7 to 24 cfs with a year-round temperature of 52°F. A 7-year drought has lowered the water volume in the aquifer above the hatchery, and thus our spring flows have been on the lower end of the previously mentioned range during 1992.

The hatchery rears rainbow trout Oncorhynchus mykiss for distribution in the Bear River, Blackfoot River, and Snake River drainages. Both Hayspur and Kamloop strain rainbow trout have been reared in 1992. A small number of fish surplus to our requests were stocked on a statewide basis.

Bonneville cutthroat O. clarki utah are spawned on the Blackfoot River, and progeny are raised to fingerlings for distribution into Blackfoot Reservoir. In conjunction with cutthroat trapping, the hatchery crew removes suckers from the Blackfoot River cooperatively with a commercial fisherman in order to remove undesirable fish from the Blackfoot Reservoir-River system. Some Yellowstone cutthroat trout O. clarki bouvieri are kept from the Blackfoot River run and held for spawning.

Another Bonneville cutthroat trap is operated by the hatchery personnel on St. Charles Creek, a tributary of Bear Lake. Fish caught in this trap are measured, sexed, checked for grit marks that indicate hatchery origin, then planted in St. Charles Creek to spawn naturally.

The hatchery raises a small number of splake (brook trout x lake trout hybrid) for stocking into Perkins, Bloom, and Hayden lakes in Northern Idaho and into Granite Lake and Upper Payette Lake in the McCall area. These fish are planted to take on the role of a top-level predator in most of these lakes with the hope that they will not reproduce and, thus, can be controlled.

The low numbers of cutthroat eggs received in recent years have opened up some space for us to rear some brown trout O. trutta. These trout are released in the Bear River and Snake River drainage as spring fingerlings and into the Salt River drainage (Crow and Stump Creeks) as fall fingerlings.

HATCHERY DESIGN

Grace Hatchery uses cement rearing ponds for producing trout. The early rearing units consist of 16 vats contained in a building, 16 small raceways east of the vat building, and 4 medium raceways south of the small raceways.

The small raceways are oriented in an east-west direction so that direct sunlight in the water is minimized. This low light situation allows us to rear wild fish because it reduces their stress. Each of the small raceways has a rearing volume of 365 cubic feet. The vats have a rearing volume of 36.3 cubic feet and are used for starting fish on feed, as well as rearing splake for the major part of their growth period.

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The four medium raceways are oriented in a north-south direction and are used to finish off splake, browns, and for rainbow fingerling production. These raceways each have a rearing volume of 1,024 cubic feet.

Final rearing of rainbow catchables and fall fingerlings is done in the east-west orientation in the large raceways. These 14-foot wide raceways are located on the southernmost end of the hatchery grounds and have reuse water feeding into them from the vats and small and medium raceways. Each of the six large raceways has 7,500 cubic feet of rearing space. The northernmost large raceway, L1, has not been used for many years because of low flows. The other five large raceways, L2-L6, are used exclusively for rainbow production on a year-round basis.

FISH PRODUCTION

During 1992, Grace Hatchery produced 2,318,262 fish, of which 1,540,379 were planted and 777,883 were on station on December 31, 1992 (Table 1).

Rainbows raised at the hatchery during 1992 were mostly Hayspur strain with a small percent being Hayspur Kamloops. The Kamloops were to be planted in Blackfoot Reservoir, but were shifted to the Snake River when it was evident that Blackfoot Reservoir would go dry or get so low that conditions would be unsuitable for trout.

Both the Hayspur and Kamloops strain rainbows were attained from Idaho Department of Fish and Game's (IDFG) Hayspur broodstock facility. Hayspur strain rainbows are desirable in the Grace Hatchery planting area because they are fall spawners and, thus, are less likely to interbreed with Bonneville and Yellowstone cutthroat. Most lots of Hayspur strain rainbows have a low level of precocial males and handle well in the hatchery. The Hayspur strain of rainbow is a deep-bodied fish and is a hard fighter when hooked in the waters of the area.

Bonneville cutthroat eggs come from the trapping operations on the Blackfoot and Little Blackfoot rivers. These fish originally came from the Swan Creek Trap, a tributary to Bear Lake in Utah. Severe drought conditions in the Blackfoot River drainage have depleted this stock of cutthroat as low dissolved oxygen and warm water temperatures above 70°F have been documented throughout the reservoir. The future continuation of this egg source is in doubt even with a good snowpack in 1993. Bonneville cutthroat eggs taken from this site are hatched, reared, and released as spring fingerlings in the Blackfoot River at the China Hat trap site.

Yellowstone cutthroat, believed to be the native fish from the Blackfoot River system, are also spawned at the Blackfoot trap. These eggs are hatched, left in the incubators until swim-up, and then planted into an underseeded tributary of the Blackfoot River (Spring Creek) that has excellent spawning substrate and nursery waters.

Catchable size rainbows are raised for put-and-take fisheries, fingerlings are released into waters for put-grow-and-take fisheries, and fry plants have been used to attempt reestablishment of wild runs.

Walleye fry were sent to us from the Blind Pony Hatchery in Missouri and were of the Osage River strain. Sauger eggs were shipped to us from Genoa Hatchery in Wisconsin. These fish were not brought onto hatchery grounds, but upon receipt, were taken and immediately placed in Oneida Reservoir.

None of the fish reared at Grace Hatchery were transferred to other hatcheries in 1992. We did haul some brown trout to Crow Creek for the Hagerman

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Hatchery, but they were directly planted in Crow Creek and did not spend any time at Grace Hatchery.

During 1992, fry averaged \$38.34/pound and \$0.022/fish, spring fingerlings averaged \$1.84/pound and \$0.054/fish, fall fingerlings averaged \$1.87/pound and \$0.187/fish, and catchables averaged \$0.625/pound and \$0.206/fish (Table 2).

Catchables planted in 1992 averaged \$0.23/pound and \$0.11/fish (Finishing costs only, accrued in 1992. Does not include costs accrued in 1991). Catchable rainbows being held for the 1993 planting season cost \$1.45/pound and \$0.296/fish (Table 2).

Feed costs were calculated by adding up feed costs for each month and subtracting this cost from the total expenses for each month on the transaction registers. The resulting monthly non-feed costs were then multiplied by the percent of the total hatchery fish population that each lot contained. Then this value was added to the feed costs for each lot. Capital outlay expenses were not used in the cost calculations.

HATCHERY IMPROVEMENTS

The major construction projects for 1992 were done on residences 2 and 3. Residence 2 had the bathroom completely tore apart, new sheetrock was put on the walls and painted. New plumbing fixtures and cabinets were also installed. The kitchen and bedrooms were repainted, and new fluorescent light fixtures were installed in the kitchen and basement, and the wood stove was moved to the main floor from the basement. Residence 3 had a metal roof installed over the existing wood one, and a new wood burning stove was purchased and installed on the main floor.

There were numerous projects done around the grounds of the hatchery; the following are the most significant. The hatchery effluent was diverted past the settling pond so it could be dewatered and cleaned. Engineering cleaned sludge out of the pond, they also repaired the leaks around the Cippoletti weir so we could get a more accurate reading on discharge flows. The hoist that sat in front of the seven stall shed was moved up beside the bulk feed bins. This was done to make it possible for the large transport trucks to drive completely around the large raceways. The visitor center shed was painted and a new fence was built leading to it. The entrance road to the hatchery was worked on, the lower section was cut at an angle to prevent water runoff from running down it and entering the basement of residence 3. A cattle guard was taken out of the road and transferred to the Region 5 Wildlife Land Manager.

Other improvements around the facility included replacement of PVC slip joint plumbing lines in the vat room with threaded connectors to prevent the air surges from blowing them apart. Filters in the bottom of the upweller incubators that continually plugged up with debris were replaced with marbles. A 2-inch line was installed from the spring to a water trough for Robert Harris' cattle. A large sprinkler head that attached to the trash pump was built for watering the lawns. This eliminated a lot of time moving garden hoses. A heater was installed on the Kubota to make starting in the winter easier.

Projects that we would like to work on in 1993 include, building baffles for the large raceways to assist in cleaning them during these low flow periods; eliminating the air surges that enter the vat room (they cause the eggs to be blown out of the upwellers and shake the pipes until they break); build a pipeline from the cleaning line on the small raceways to raceway M1 so we could use M1 as a common collection basin for loading fish out of S1-S16.

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FISH HEALTH

Once again the largest number of mortalities occurred during early rearing after the first few months of ponding (Figure 1). Early rearing mortality can be attributable to broom mortality, deformities such as scoliosis, lordosis, siamese twinning, and possibly to gas supersaturation. The air surges in our lines may be caused by a venturi action of air high in the collection system piping. We will be looking for vortexes in the collection house or pipe leaks that suck in air. Often spring water comes out of the ground in a supersaturated state. These problems could all be eliminated with a surge tank being installed outside of the vat building. This surge tank could be loaded with koch rings to degas the water, and would also remove the air bubbles that blow off our plumbing.

The Eagle Fish Health Lab has traditionally taken tissue samples from the Bonneville and Yellowstone cutthroat that we spawn on the Blackfoot River to see if we have any pathogens in the eggs from this run. Each egg take is placed in Heath trays that are plumbed individually so that each tray has single-pass first use water. Eagle Lab is supposed to run tests on ovarian samples from each egg take to see if pathogens are present and notify us immediately so we can discard infected lots. We have never been notified before ponding in the last three years and have either ponded the fish or planted them out as fry before notification.

Rainbow trout at the station were not fed antibiotics during early rearing this year because we feel that this prophylaxis measure has no effect on the Coldwater Disease episodes at the station. The experiment conducted in 1991 proved the control group had less Coldwater Disease than groups treated with antibiotics and vaccine. We feel that Hayspur Hatchery will eventually eliminate this disease by culling out positive broodstock. Our experiment in 1991 gave strong evidence that the major source of infection from this organism is through vertical transmission. We have not suffered any major losses to this disease during 1992.

Egg loss due to poor fertilization and/or poor egg quality occurred in the Bonneville cutthroat trout. The males produced sperm throughout the spawn taking this year, and synchronous maturation was not a problem like it was in 1991. High temperatures in the holding waters of the Blackfoot River evidently made for weak egg formation (Figures 2 and 3). During egg formation time in April, the Blackfoot River temperatures were consistently 10 to 15 degrees warmer than they were in the 1992 trapping season. By mid-May, it is possible that egg development ceased because river temperatures were consistently over 60°F.

Many times the egg skeins were not loose one day, then the next day they would loosen up and the eggs would be over-ripe. Some of the eggs were soft shelled and flaccid and contained some dead eggs in them when spawned. In coming years the fish will be held in spring water at a different location after river temperatures top 55°F. This may help the fish perform gametogenesis under more ideal conditions and reduce prespawning mortality.

The splake had a chronic low-level die-off throughout early rearing. Samples were taken by the Eagle Fish Health Lab, but they could not determine a cause for this disease. The fish would get lethargic and lay on the bottom or swim on their sides. Some samples were sent to Leetown for diagnosis, but no pathogens were found. This morbidity and mortality stopped when the fish were about 7 inches in length.

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FISH STOCKED AND TRANSFERRED

Catchables stocked by Grace Hatchery in 1992 ranged in length from 212 mm to 320 mm. The largest catchables were seined out of the settling pond. Bonneville cutthroat fingerlings ranged in length from 145 mm to 154 mm. Rainbow spring fingerlings were 93 mm to 107 mm when planted. Fall fingerling rainbow (Hayspur strain) ranged from 152 mm to 160 mm. Most of the fall fingerlings were planted in the seven drawdown study reservoirs. Splake fall fingerlings that went to Region 3 averaged 157 mm, and those that went to Region 1 averaged 173 mm.

Most of the catchable fish plants were made when requested, and all numbers were met. Little Valley Reservoir was stocked in April instead of the March request date because snow and mud made it impossible to get in during March.

The new small raceway cleaning line improved water conditions in the large raceways to such an extent that we had a surplus of 22,508 rainbows. Fecal materials from the small raceways have been bypassed during cleaning in 1992 directly to the settling pond instead of to the settling pond via the large raceways. Bacterial Gill Disease was not encountered in the catchable rainbows and, thus, the 20,000 fish plus mortality normally experienced here in the past has been eliminated.

Surplus catchables were stocked in the Kelly Park Pond in Soda Springs (1,652), Trail Creek Beaver Ponds (1,946), McTucker Ponds (3,019), Devils Creek Reservoir (1,758), Trout Creek (952), 8-Mile Creek (950), Little Malad (1,050), Mink Creek (2,506), the Portneuf River (2,473), Hawkins Reservoir (3,420), Weston Reservoir (2,280), and in Soda Creek (502). The Kelly Park Ponds, Trail Creek Beaver Ponds, Trout Creek, and Mink Creek plants became so popular with the public that it has been decided to schedule them in as regular plants by the hatchery in 1993. Kelly Park Ponds are located on Ledge Creek above the park. The City of Soda Springs has designated this area as a "children under 14 only" fishing area. The City of Soda Springs and IDFG made a dike around the south end of the pond and dredged out the pond to make it easier to fish. A Free Fishing Day Clinic was held on this pond instead of in the Grace Hatchery settling pond.

The Trail Creek Beaver Ponds are at the headwaters of Trail Creek, which is a tributary of the Upper Blackfoot River. The people of Soda Springs have built a picnic area and warming hut for snowmobilers in this area, and the Caribou County Archery Club has a unique archery range bordering these ponds. A sportsman from Soda Springs asked the hatchery to stock this high-use area with some fish. After looking at the area, we decided to propose to the Region that this area be stocked and received approval. The ponds are easily accessible from gravel roads and have an abundance of amphipods in them as a food source. The fish grew well in this area over the summer and were beginning to have orange flesh by the fall.

Trout Creek is south of Grace Hatchery and was canceled as a regular fish plant in 1991 because of poor riparian use by cattle ranchers and dairy farmers. The creek runs through feed lots and is almost entirely on private property. The Region has asked us to plant it again in 1993. Many Utah fisherman dropped by the hatchery and complained about it not being stocked in 1991, so the Region has requested that we stock it twice in 1993 with 1,000 fish each time.

Mink Creek is a tributary of the Portneuf River and joins the Portneuf about five miles south of Pocatello. The Forest Service has developed a nature trail in the Cherry Springs area of this creek and has kept cattle and motor vehicles from damaging the riparian zone. The area has a paved trail following the creek and has picnic tables and signs explaining different aspects of the environment. Wheelchair access for fishing is provided in several spots along

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the creek. The area appears to be heavily fished because of its proximity to Pocatello. The heavy riparian growth shades this creek and keeps the water temperature in the proper range for good trout growth.

Surplus fall fingerlings were stocked in Hawkins Reservoir (9,075) and into Island Park Reservoir (30,769). Surplus spring fingerling rainbows were planted in the Snake River at Mark Schrader's property and off the Thomas Road boat ramp. After this plant was made, some farmers dammed off the river and dewatered this stretch of river. It is believed most of this plant died in the warm pools they were stranded in.

Several plants had to be canceled or reduced in number because of low water conditions resulting from the drought. The fall plant of catchables into Foster Reservoir was reduced from 2,000 to 1,035 because the reservoir had been drained and was barely refilling at planting time. The remainder of the fish scheduled for this plant were put in Little Valley Reservoir.

The fall fingerling plant scheduled for Treasureton Reservoir was canceled because the reservoir was drained by irrigators. This reservoir is one of the catchable-fingerling study reservoirs and has been one of our most productive reservoirs in the region. We will start all over again with this fishery in 1993.

The hatchery has had a fall fingerling plant of 500,000 rainbows scheduled for Blackfoot Reservoir in past years, but the extremely low water conditions forced us to switch the fish from Blackfoot Reservoir to the seven drawdown study reservoirs. The reservoir research team feels that they would like all of the study fish to come from Grace Hatchery so that we can eliminate another variable. Some of the fall fingerlings being raised for the Blackfoot Reservoir were planted in the Snake River and Island Park Reservoir as spring and fall fingerlings.

The fish scheduled for Paris Creek were moved to Bloomington Creek because of low flows in Paris Creek and because a landowner threatened to sue the Department if we kept planting fish there. The scatter plant in Bloomington Creek was moved farther up the drainage than in the past so that the fish were available in the camping areas and more scenic spots of the creek that are frequented by tourists. This change by the hatchery resulted in many compliments from some hard to please citizens in the area. Several fisherman could be seen fishing the areas we had planted, and most of them had fish on their stringers.

Some of the plant numbers were shifted because of sportsmen's preferences that were brought up at public meetings. The Franklin County sportsmen complained about too many rainbows being stocked in Condie Reservoir and preferred that part of these be planted in The Oneida Narrows Section of the Bear River.

We shifted 8,000 of the 16,000 scheduled for Condie Reservoir to this section of the Bear River, and split the 8,000 fish into two 4,000 fish plants put in at three plant sites each time.

The plants in the Bear River from Alexander Dam to the Oneida Narrows were reduced in number so that more fish could be planted in the Bear River from Montpelier to Georgetown. We made available 6,000 fish for this stretch of the Bear River, and put 1,000 fish at each of three sites in the spring and fall. The plant sites included Pegram (near the Wyoming border), Stewart Dam (near Dingle and Montpelier), and Nounan Bridge (near Georgetown and Nounan). This movement of fish made stocking numbers more equitable between the communities that live along the Bear River. These new plants were jaw-tagged and it was found that the spring plants returned poorly, but the fall plant at Stewart Dam has shown some promise.

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FISH SPAWNING

Bonneville cutthroat and Yellowstone cutthroat were spawned on the Blackfoot River system (Tables 3 and 5). Four of the 19 Bonneville cutthroat females were from the Little Blackfoot River. The eye-up of eggs from these fish was almost double what the Blackfoot River females eggs were.

Some of the wild Yellowstone cutthroat were kept for spawning. Every 20th female entering the trap was held; two males were kept for every female. The eggs from the Yellowstone cutthroat were hatched and planted in Spring Creek and Diamond Creek.

Bonneville cutthroat were spawned from May 1 to June 1 (Table 5). A total of 29,690 eggs were taken, yielding 13,907 eyed eggs. Yellowstone cutthroat were spawned from May 15 to May 23 (Table 5). A total of 17,851 eggs were spawned, yielding 16,671 eyed eggs.

Water temperature during the spawning period was above 60°F for 28 of the 31 days (Figures 2 and 3). The average water temperature for the month was 65°F, with the high reaching 71°F on May 24 and 25.

FISH FEED

The fish in the upper hatchery were fed by hand, belt feeders, and pan feeders. The belt feeders used were on loan from Nampa Hatchery, and our budget allowed us to purchase two for the Grace Hatchery.

A feed study was conducted to compare Rangen's and Clear Springs feed. The fish used for the study were from lot 92-ID-R9C, and the study ended when the fish reached 40 fish per pound. The study showed that the fish fed Rangen's feed had a slightly better growth rate and feed conversion than the Clear Springs group. Based on the study, Rangen's continues to be the primary feed used on the hatchery.

Bio-Products moist feed was used to start the Bonneville cutthroat, then the fish were switched to Rangen's soft moist feed. Studies in the past have shown greater survival of cutthroat fed soft-moist feeds.

During the summer, 23,250 pounds of Bio-Diet sack feed was used on a trial basis. Its use was discontinued due to the labor involved in distributing it and the fact that it is not available in bulk.

A total of 130,634 pounds of feed were fed in 1992 at a cost of \$33,739.60, which averages \$0.258/lb of feed (Table 6).

PUBLIC RELATIONS

Tours of the hatchery were given to 120 grade school students from Montpelier in May and to high school students from Grace High School in October. Numerous smaller tours were given throughout the year to the general public.

This year, the Free Fishing Day clinic was moved from the Grace Fish Hatchery to the Kelly Park Ponds in Soda Springs. Todd Garlie and Arnie Miller assisted with the clinic and a drug store from Pocatello provided prizes for the children during the day.

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Local sportsmen from Soda Springs, Pocatello, and Montpelier assisted with fish plants to the Trail Creek beaver ponds, the Snake River, and the Bear River. These sportsmen have located new planting sites for us and have attained access through private property. Their efforts are much appreciated.

Arnie Miller drove with local anglers from Montpelier to locate new fishing sites on the Bear River and to listen to their concerns. Also, the hatchery staff attended angler input meetings in Montpelier and Soda Springs.

SPECIAL PROJECTS

There were several new projects initiated this year. An effort was made by Region 5 fisheries biologists and hatchery management to provide a fishery in Soda Creek Reservoir. The reservoir is located above Hooper Park northeast of the city of Soda Springs.

The state owns the land on the south end of the reservoir and the City of Soda Springs owns the land from Hooper Park to the state land. A meeting was held in June with landowners, the mayor of Soda Springs, Monsanto Company representatives, and the Idaho Department of Lands. The meeting was held to try and gain public access across city land at Hooper Park and onto state land south of the reservoir. The mayor of Soda Springs was opposed to public access due to a problem with the Federal Energy Regulatory Commission. Also, the landowners were opposed concerning increased amounts of litter, trespassers, and vandalism on their lands around the reservoir. The landowner entities involved decided they did not want fishing allowed on this productive lake.

Many of the area reservoirs went dry this year due to the drought. Arnie Miller assisted Region 5 biologists in salvaging the fish from Chesterfield Reservoir and transplanting them to Devils Creek Reservoir. There were several hundred fish transplanted ranging from 5 to 7 pounds. These fish appeared to be Lahonton cutthroat stocked in previous years from the Nampa Fish Hatchery. Also, the hatchery staff assisted with the fish salvage at Treasureton Reservoir. The hatchery weir was installed on the creek below the dam to collect escapees.

During the fall, the hatchery staff helped management biologists sample the study reservoirs and evaluate how well the fish stocked in these waters were doing. Creel census data showed that all the fish stocked into Winder and Treasureton Reservoirs were harvested.

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ACKNOWLEDGEMENTS

Chris Clouse started the year as our Fish Culturist, but moved to Kansas in July and was replaced by Ron Reardon in September. Biological aides for the trapping season were Brian Wynn and Eric Henderson. Greg Ware was our laborer for the season and LeeRoy Jones worked at our station through the JTPA program. These men all put out a lot of effort to make the hatchery a success and their efforts are appreciated.

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Table 1. Numbers of eggs and fish received and distributed by the Grace Hatchery in 1992.

Species/ Strain	Egg source	Eggs received	Fish on hand	Fish planted	Destination
Rainbow/ Hayspur	Hayspur Hatchery	0	208,202	595,071*	Region 5,6
Rainbow/ Hayspur	Hayspur Hatchery	368,106	353,276	0	Region 5
Kamloop/ Hayspur	Hayspur Hatchery	159,595	0	146,459	Snake River Region 5
Cutthroat/ Bear Lake	Blackfoot Reservoir	0		45,079	Blackfoot River
Cutthroat/ Bear Lake	Blackfoot Reservoir	27,911	3,758	0	Blackfoot River
Cutthroat/ Yellowstone	Blackfoot Reservoir	18,121	0	15,516	Spring & Diamond creeks
Splake/ Jenny Lake x Soda Lake	Jenny Lake x Soda Lake	0	5,010	22,414	Regions 1,3
Splake/ Jenny Lake x Soda Lake	Jenny Lake x Soda Lake	51,637	47,700	0	Regions 1,3
Walleye/ Blind Pony	Blind Pony	400,000	0	400,000	Oneida Reservoir
Sauger/ Genoa Hatchery	Genoa Hatchery	315,840	0	315,840	Oneida Reservoir
Brown/ Manchester Hatchery	Manchester Hatchery	202,320	159,937	0	Region 5
Totals		1,543,530	777,883	1,540,379	

*For some species the eggs were received in 1991 and were in the previous years report.

Table 2. Cost of production at Grace Hatchery for 1992.

Lot	Number produced	Pounds produced	\$/Pound	\$/Fish
<u>FRY</u>				
Cutthroat/Yellowstone				
92IDC1	15,516	5.00	111.57	0.036
Brown/Manches				
93IABN	220,852	119.31	40.12	0.022
Rainbow/Hayspur				
93IDR9A	229,847	151.71	31.55	0.021
Splake/Auburn				
93WYSP	47,700	20.08	51.55	0.021
Subtotal	513,915	296.10	38.45	0.022
<u>FINGERLINGS-SPRING</u>				
Cutthroat/Bonneville				
91IDC5	42,071	3,564	00.79	0.066
92IDC5	3,720	72	1.56	0.030
Rainbow/Hayspur				
92IDR9A	130,180	2,954	2.04	0.046
Rainbow/Hayspur Kamloop				
92IDK1	146,459	2,899	2.68	0.053
Subtotal	322,430	9,489	1.84	0.054
<u>FINGERLINGS-FALL</u>				
Rainbow/Hayspur				
92IDR9A	26,144	2,509	2.09	0.200
92IDR9B	98,094	10,174	1.85	0.191
92IDR9C	144,593	14,473	1.83	0.183
Splake/Auburn				
92WYSP	22,414	1,991	2.08	0.185
Subtotal	291,245	29,147	1.87	0.187
<u>CATCHABLES</u>				
Rainbow/Hayspur				
91IDR9A	93,267	25,821	0.22	0.06
91IDR9B	109,072	67,218	0.24	0.15
92IDR9C	208,122	42,648	1.45	0.296
Splake/Auburn	5,000	1,087	1.81	0.395
Subtotal	415,461	136,774	0.625	0.206

Table 3. Eggs and fish received and fish transferred to other hatcheries from Grace in 1992.

<u>Date</u>	<u>Eggs Received</u>	<u>Fish Received</u>	<u>Fish Transferred</u>
<u>Rainbow Trout/Hayspur Strain</u>			
11/16/92	244,677	0	
12/30/92	93,778	0	
12/30/92	29,651	0	
Subtotal	368,106		
<u>Kamloop/Hayspur Strain</u>			
1/28/92	71,283	0	
2/5/92	48,418	0	
2/12/92	38,894	0	
Subtotal	159,595		
<u>Splake/Soda Lake x Jenny Lake</u>			
11/04/92	51,637	0	
Subtotal	51,637		
<u>Brown Trout/Manchester Hatchery</u>			
11/16/92	202,320	0	
Subtotal	202,320		
<u>Bonneville Cutthroat/Blackfoot Res.</u>			
05/92	27,911	0	
Subtotal	27,911		
<u>Yellowstone Cutthroat/Blackfoot Res.</u>			
05/92	18,121	0	
Subtotal	18,121		
<u>Walleye/Osage River, Blind Pony Hatchery, Missouri</u>			
04/07/92	0	400,000	0
Subtotal	0	400,000	
<u>Sauger/Genoa Hatchery, Genoa, Wisconsin</u>			
D4/22/92	315,840	0	
Subtotal	315,840	0	
Total	1,142,530	400,000	

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Table 4. Lab results of necropsies done at Grace in 1992.

Brood Year	Species/ Strain	Date	VH	VP	VE	BK	BF	BR	BC	PX	PW	PC	PI
Brood	Cutthroat/Bear Lake	5-15											
Brood	Cutthroat/Bear Lake	5-19	-	-		-							
1991	Cutthroat/Blackfoot River	3-11				-							
Brood	Cutthroat/Blackfoot River	5-01											
Brood	Cutthroat/Bonneville	5-19				-							
Brood	Cutthroat/Yellowstone	5-19				+							
1992	Kamloop/Hayspur	6-10	-	-		-	-	-	-				
1990	Rainbow/Hayspur	3-11	-	-		-	-	-	-				
1991	Rainbow/Hayspur	6-10	-	-		-							
1991	Splake/Wyoming	3-11	-	-									
1991	Splake/Wyoming	7-20											

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Table 5. Blackfoot River / Little Blackfoot River Cutthroat spawn taking for Onchorhynchus clarki utah and Onchorhynchus clarki bouvieri spring 1992.

Date	Females Spawned	Egg Yield	Fecundity	%
BONNEVILLE CUTTHROAT				
5/01	2	3,322	1,661	64 ₁
5/08	3	3,125	1,042	82
5/11	1	2,083	2,083	0 ₂
5/15	3	3,584	1,195	40
5/17	1	1,823	1,823	17
5/19	1	2,412	2,412	17
5/21	2	3,576	1,788	49
5/23	3	5,039	1,680	92 ₃
5/27	1	2,083	2,083	8
5/29	1	1,643	1,643	3 ₄
6/01	1	1,000	1,000	0
	19	29,690	1,469 (MEAN)	50
YELLOWSTONE CUTTHROAT				
5/15	2	4,700	2,350	85
5/17	1	3,458	3,458	97
5/19	1	3,300	3,300	94
5/21	1	3,700	3,700	92
5/23	1	2,693	2,693	93
	6	17,851	3,020 (MEAN)	92

₁Sperm extender was used on half of this lot and resulted in a lower eye-up.

₂Overripe eggs.

₃Little Blackfoot River females.

₄Overripe eggs.

GRACE

Table 6. Feed used at Grace Hatchery during calendar year 1992.

Feed Size	Pounds Used	Cost/Pound	Total Cost
<u>Dry Feed (Rangen's)</u>			
Swim-up	200	0.4400	88.00
#1	400	0.4400	176.00
#2	300	0.4400	1,012.00
#3	4,000	0.4400	1,760.00
#4	11,600	0.2810	3,259.20
Coarse Crumbles	7,200	0.2780	2,003.90
5/32 Sack	1,600	0.2250	360.00
5/32 Bulk	75,900	0.2490	17,046.63
Subtotal	101,200	0.2540	\$25,705.73
<u>Soft Moist Feed (Rangen's)</u>			
Starter	26	0.7250	18.85
1/32	56	0.6550	36.68
3/64	132	0.6250	82.50
1/16	264	0.5900	155.76
3/32	660	0.5600	369.60
1/8	2,170	0.5600	1,215.20
Subtotal	3,308	0.5670	\$1,878.59
<u>Dry Feed (Clear Springs)</u>			
#1	50	0.3590	17.97
#2	250	0.3590	89.75
#3	750	0.3590	269.48
#4	1,400	0.2820	395.36
#5	250	0.2820	70.60
Subtotal	2,700	0.3120	\$843.16
<u>Moist Feed (Bio-Products)</u>			
#1	88	1.120	98.56
#2	44	1.120	49.28
#3	44	1.120	49.28
Subtotal	176	1.120	\$197.12
<u>Dry Feed (Bio-Products)</u>			
2.5 mm	250	0.2200	55.00
3.0 mm	23,000	0.2200	5,060.00
Subtotal	23,250	0.2200	\$5,115.00
Total All Feed	130,634	0.2582	\$33,739.60

Table 7. Rainbow trout fin and fat indexes for Grace Hatchery, 1992.

Date	Species/ Strain	Pond	Total length	Fin ratio	Fat index
<u>CATCHABLES</u>					
02/10/92	Rainbow/Hayspur	S2	237	38	
02/10/92	Rainbow/Hayspur	L3	231	81	
03/03/92	Rainbow/Hayspur	S3	240	42	
03/03/92	Rainbow/Hayspur	L3C	211	67	
03/17/92	Rainbow/Hayspur	L3	221	77	
03/26/92	Rainbow/Hayspur	L4	221	83	
04/15/92	Rainbow/Hayspur	L4	244	53	
07/31/92	Rainbow/Hayspur	L2	249	63	
		Mean =	232 (9.1")	63	
<u>FALL FINGERLINGS</u>					
09/29/92	Rainbow/Hayspur	L4	154	71	1
09/29/92	Rainbow/Hayspur	M2	156	62	3
10/01/92	Rainbow/Hayspur	S5-S8	158	58	3
10/01/92	Rainbow/Hayspur	S1-S4	163	58	3
		Mean =	158 (6.2")	62	2.5

GRACE

Table 8. Grace Hatchery fish marking for the 1992 calendar year.

<u>Species/ Strain</u>	<u>Date</u>	<u>Number clipped</u>	<u>Type clip</u>	<u>Fish/ hour</u>	<u>Destination</u>
<u>Cutthroat/Bonneville</u>					
91IDC5	01/06/92	18,840	Adipose	2,631	Blackfoot Reservoir
91IDC5	01/07/92	24,870	Adipose	3,777	Blackfoot Reservoir
Subtotal		43,710			
<u>Rainbow/Hayspur</u>					
91IDR9C	06/23/92	8,440	L.Maxill	1,206	Study Reservoir*
91IDR9C	06/24/92	11,820	L.Maxill	1,688	Study Reservoir
91IDR9C	06/25/92	11,530	L.Maxill	1,647	Study Reservoir
91IDR9C	07/01/92	11,600	L.Maxill	1,546	Study Reservoir
91IDR9C	07/02/92	3,840	L.Maxill	1,357	Study Reservoir
91IDR9C	09/22/92	10,590	L.Maxill	1,925	Study Reservoir
91IDR9C	09/23/92	13,040	L.Maxill	1,738	Study Reservoir
91IDR9C	09/24/92	11,610	L.Maxill	1,488	Study Reservoir
91IDR9C	09/25/92	8,180	L.Maxill	2,231	Study Reservoir
Subtotal		90,650			
<u>Splake/Jenny x Soda Lake</u>					
91WYSP	07/02/92	5,210	Adipose	1,488	Upper Payette Lake
Subtotal		5,210			
TOTAL		139,570			

*Study reservoirs include Chesterfield, Springfield, 24-Mile, Daniels, Twin Lake, Treasureton, and Winder.

1992 MORTALITIES BY MONTH

HAYSPUR RAINBOW LOT 92-ID-R9C

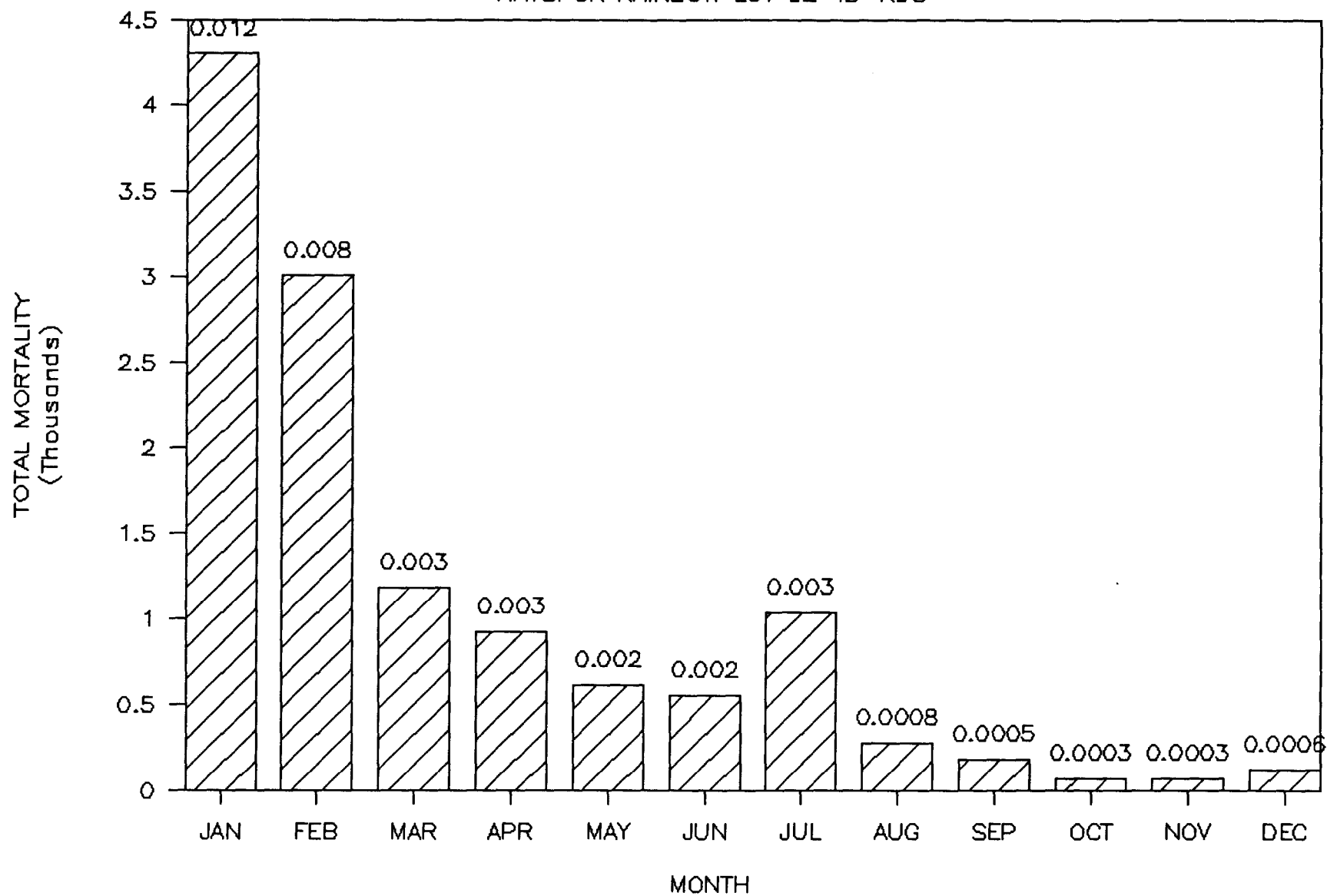


Figure 1. Number of mortalities and percent mortalities by month for Hayspur rainbow, Lot 92-ID-R9C.

Blackfoot River Trap Temperatures

Daily 5 p.m. Temperature Degr. F.

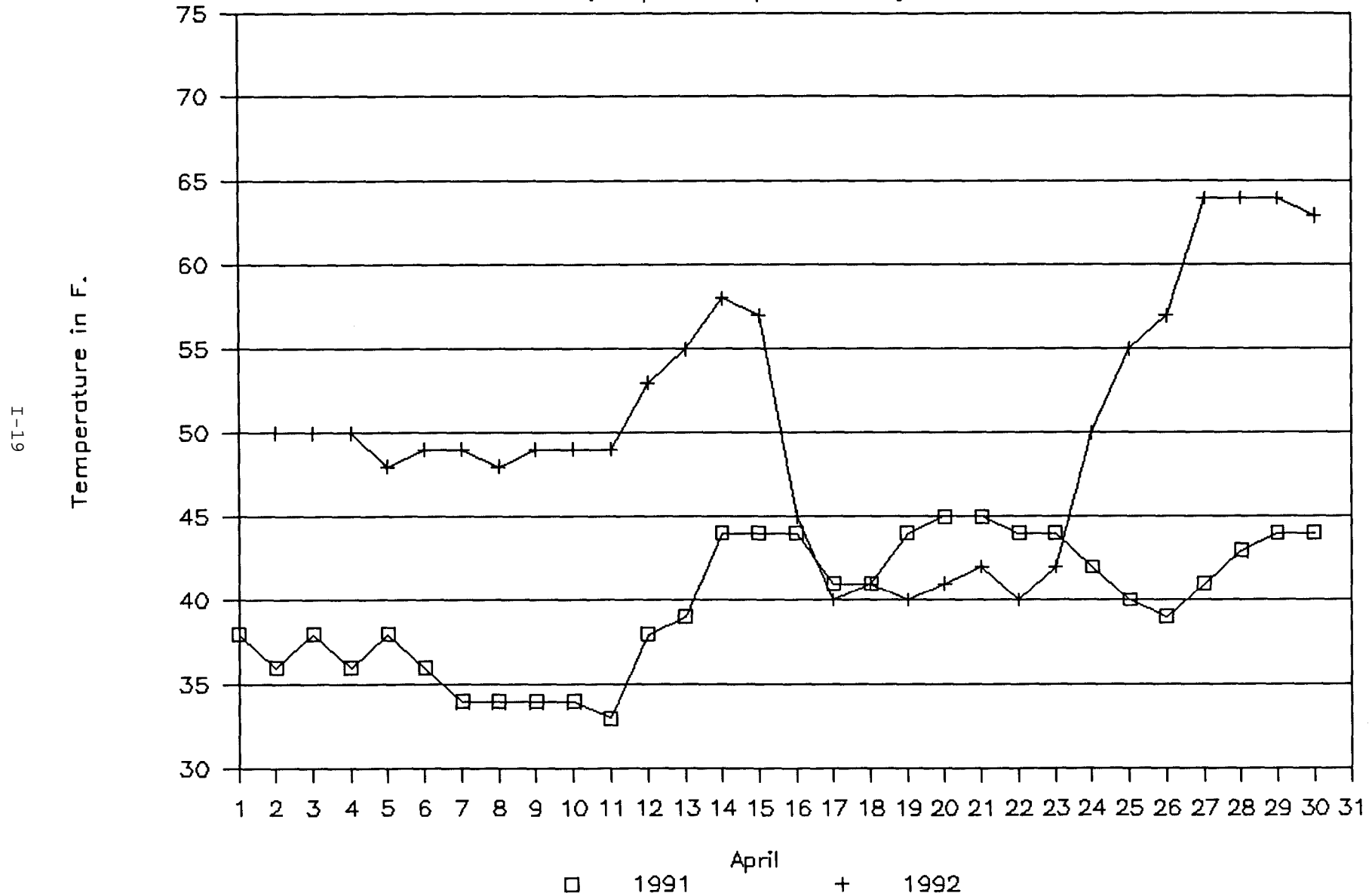


Figure 2. Water temperatures in the Blackfoot River for 1991 and 1992 at China Hat trap in April.

Blackfoot River Trap Temperatures

Daily 5 p.m. Temperature Degr. F.

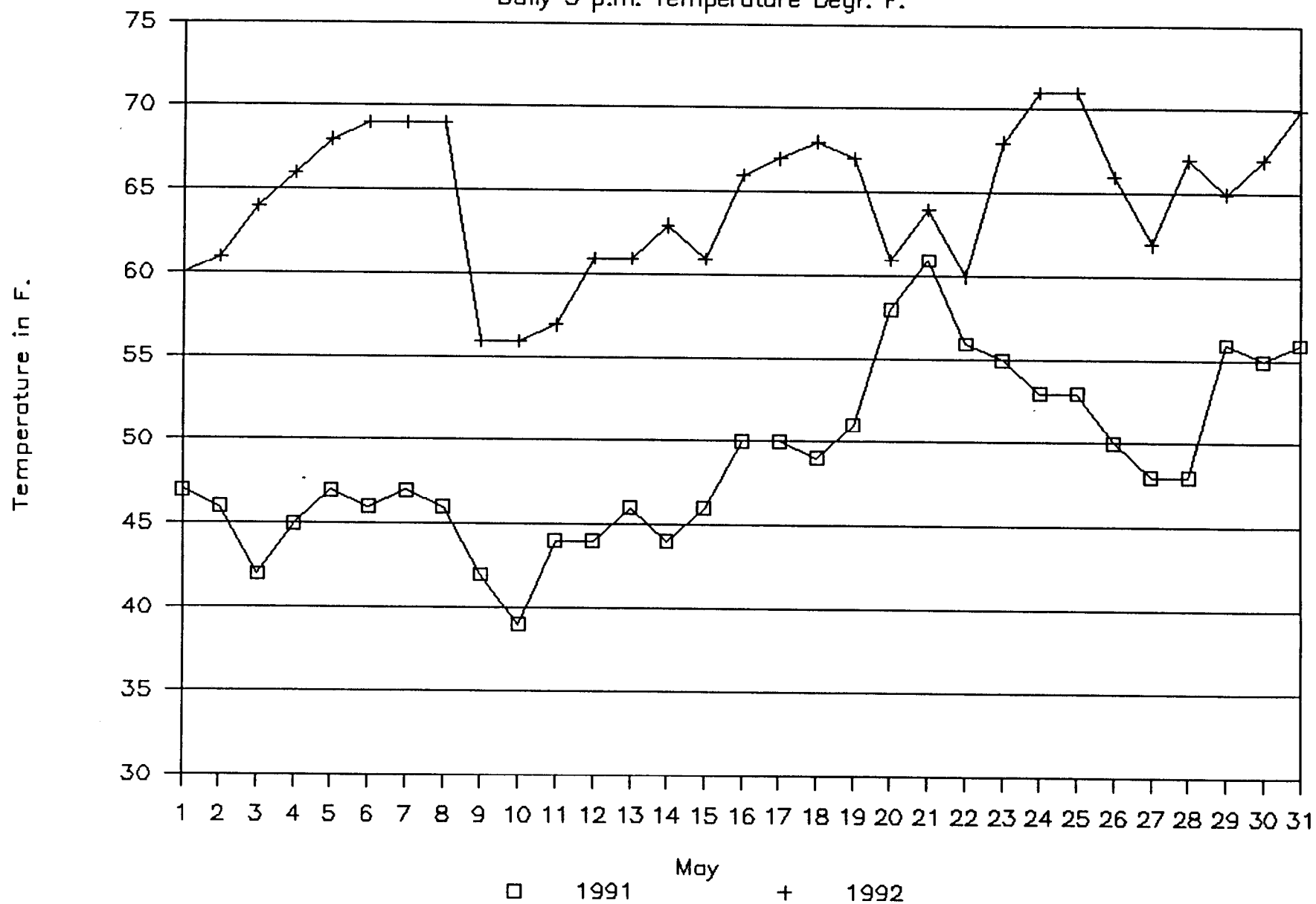


Figure 3. Water temperatures in the Blackfoot River for 1991 and 1992 at China Hat trap in May.